



Notes for Water Watchers

Kansas Department of Health and Environment

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Fishes' View of the World Demonstration

Certain fish need clean water for feeding, spawning, and other life processes. Other types of fish can survive in muddy water, but they don't thrive in it. This demonstration illustrates a fishes' view of the world, experiencing different levels of water clarity, from clear to muddy and murky.

Many types of fish feed by sight. If the water is too cloudy for fish to see food, they will be less likely to survive and thrive as a population. Some might think muddy water is better because the prey are unseen. Generally, there are better mechanisms for fish to avoid predators than relying on water clarity. It's important to note that *clear* water doesn't always mean "*fish friendly*" water. In nature, it is better for most fish to live in translucent water than water that is too clear. If water is too clear (like looking at tap water through a container), it is probably lacking in zooplankton or phytoplankton, which begin the lower aquatic food chain. In combination with shallow water and high nutrients, clear water can create problems with excessive amounts of weed growth.

What you need to perform this demonstration:

- Four quart size, clear, plastic jars with lids
- Four one inch rubber or plastic fish lures
- Four pieces of split shot (size BB)
- Two pound test monofilament fishing line
- Soil (Soil type will make a difference. Soil should be free of large objects and rocks. Some filamentous roots are acceptable).
- Drill or sharp instrument to bore or punch hole in lid.

To begin, put 1/4 cup, 1/8 cup, and 1/16 cup of soil in separate jars, fill with tap water to about 3/4 full, then stir, shake, or mix well.

The next step is to bore a small hole in the middle of the lid. We suggest using a 1/4 inch drill bit or other sharp, heated object such as a nail or the end of a paperclip.

Slice the top of each fish lure open just enough to slide the lead shot inside, then close the opening. A sharp knife or exacto blade works best. Thread the fishing line through a needle, push the needle through the fish lure from the belly through the back, approximately 1/2 inch below the head. Make sure the needle comes out the top of the fish through the middle, so it will be balanced when suspended parallel to the jar bottom. Put the line through the shot and crimp or squeeze it with pliers. Lower the fish into the water, about halfway below the top of the jar. Pull the line up through the lid, put the lid on and tighten, then tape the line at the top or tie onto something to keep the line from going back through the hole (a small paper clip or toothpick works well). Make sure the fish is suspended in the water. Clip the line. Repeat the above steps with the three remaining jars.

To illustrate a fishes' view of the world, shake each jar without inverting it. Note how cloudy and murky the water becomes in the jars containing the different amounts of soil. Also note the duration of time it takes for the soil to settle to the bottom. This is a good illustration of how soil erosion and excessive sedimentation of streams can be harmful to aquatic life. Use different soil textures to represent your local area (clay, loamy, silty, or sandy). Because of the settling time differences, high clay soils can be used for long duration demonstrations. For short demonstrations, use sandy, silty, or loamy soil. High clay soils generally tend to be sticky and easily pressed into a ribbon (between thumb and finger) without falling apart when wet.

CAUSES

- Soil without vegetative cover (construction sites, cropland, trails) washes into lakes and streams.
- Livestock or hooved wildlife wading in a stream or pond can also cause turbidity.
- Aquatic animals, including fish, crawdads, and others which feed, swim, or crawl on the bottom, stir up silt and sediment which cloud the water.
- Wind or water flow keeps waters muddy.
- Soil is not the only thing that makes water cloudy. High numbers of tiny plants and animals, (zoo and phytoplankton, algae, bacteria) or some natural or manmade chemicals may also cause water to be cloudy.

EFFECTS

- Sight-feeding animals (mainly fish) are affected because of the difficulty of finding their food.
- Their homes, habitat, or eggs may be destroyed or damaged from the settling of silt on them, making them less desirable. Deposits of sediment or silt on egg-laying spots may cause problems for young hatchlings.
- Muddy water is usually warmer than clear water because it absorbs heat.
- Clear water may not be the best either because if it is clear (chlorinated tap water in display bottle), there may not be enough tiny plants and animals for smaller fish to feed on, which in turn are eaten by other larger fish and animals as they move up the food chain. (Remember, in an aquarium, fish are fed so the water can be filtered and is clearer. In nature, the water system has to manufacture its own food).
- It may be harder for the fish to breath through their gills because of the dirt clogging them.
- Pesticides and other toxic chemicals may attach to soil particles. Fish, such as catfish and carp, may swallow these soil particles and accumulate the toxic materials in their tissue.
- Which water would you want to picnic by, fish, or wade in? Hint, choose water that doesn't smell, and has a lot of different, visible plants and animals (diversity). Also, note if you can see the bottom and some green or blue color. Stay out of areas where pipes discharge into the water, where there is a "pea green soup" appearance, or a seasonably unnatural color.

For additional information, please contact KDHE, Bureau of Water - Nonpoint Source Section, Forbes Field, Bldg. 283, Topeka, KS 66620-0001; (785) 296-4195.

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